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mals, fails to give rise to any symptoms of the disease. Horse-sickness blood filtered through a porcelain filter is still infective; the opposite holds good up to the present with heart-water. Horse-sickness blood can be kept for years without losing its virulence; heart-water blood loses it in forty-eight hours.

Heart-water has a peculiar distribution, being restricted to the certain tracts of country with a warm, moist climate. It is known to farmers that if they remove their flocks to the high veld the disease dies out.

To Lounsbury is due the credit of explaining these facts. He found that the disease is carried from sick to healthy animals by means of the bont tick, *Amblyomma hebraeum*. This tick leaves its host between each molting, and a larva which sucks the blood of an infected animal is capable of giving rise to the disease in a susceptible animal as either a nymph or imago. The distribution of this tick corresponds to the distribution of the disease. If this tick could be killed off, the disease would disappear from the country. This could doubtless be done on individual farms by long-continued dipping; but in the meantime some method of immunization might be devised.

D. BRUCE.

THE AMERICAN ASSOCIATION FOR THE
ADVANCEMENT OF SCIENCE.

SUMMER MEETING OF SECTION C. GEOLOGY
AND GEOGRAPHY.

THE section of geology and geography (Section E) of the American Association for the Advancement of Science held a summer field meeting at and near Syracuse, N. Y., July 19 to 22, inclusive, in conjunction with the intercollegiate summer courses in geology. Although the attendance was not large, it was fairly satisfactory, and as many participated in the daily excursions as could be cared for con-

veniently on foot. The heat of the early part of the week moderated somewhat by Thursday, the first field day of the meeting, and good weather prevailed during the sessions.

The opening session was held on Wednesday evening in the chapel of the College of Liberal Arts of Syracuse University, and was called to order by the secretary of the section, who introduced as chairman of the meeting Professor William North Rice, of Middletown, Conn., in place of Professor E. A. Smith, of University, Ala., chairman of the section and vice-president of the association for 1905, who was absent on account of his duties as state geologist of Alabama. Addresses of welcome were delivered by Mayor Alan C. Fobes in behalf of the city of Syracuse, by Dean Frank C. Smalley in behalf of Syracuse University and by Dr. John van Duyn in behalf of the University Club. After a felicitous reply by the chairman, Professor T. C. Hopkins, of Syracuse University, briefly outlined the program of work and excursions for the succeeding days and gave a concise sketch of the geology of the vicinity of Syracuse.

On Thursday the members and others in attendance divided for convenience into two parties, one of which, under the guidance of Professor Hopkins, devoted its attention during the morning to problems of stratigraphy near Jamesville, southeast of Syracuse, while the other, under the leadership of Professor H. L. Fairchild, of Rochester, studied the great Railroad Channel and other river channels formed during the recession from central New York state of the ice of the glacial epoch. The two parties met about noon at Green Lake near Jamesville and, after luncheon, listened to an exposition of 'The Local Glacial Features,' by Professor Fairchild. The most striking of these features are the drumlins, which have long been familiar to

geologists, and the marginal stream channels and 'fossil waterfalls,' the details of which have been developed and described by Fairchild and others. Green Lake, or, as it has been rechristened, Jamesville Lake, is a pretty pond without surface outlet lying in a gorge at the base of a hundred-and-fifty-foot cliff over which in glacial times there must have poured a waterfall comparable in height and volume to the present Horseshoe Fall at Niagara.

Professor Hopkins then gave a paper on the 'Stratigraphic and Economic Geology of the Syracuse Region.' The greater part of the city is located on outcrops of Salina (Silurian) shales. North of the city there occur within a few miles outcrops of the Niagara limestones and shales, the Clinton limestones and shales and the Medina sandstone. In going southward from the city one traverses the upper divisions of the Silurian and the Devonian. In the near vicinity of Syracuse are the type localities of several important groups. The chief economic geologic products of the vicinity of Syracuse are common salt, gypsum and limestone.

In the afternoon the combined parties traversed the great glacial river channel lying southwest of Jamesville and extending from Butternut Creek on the east to the upper slopes of the valley of Onondaga Creek on the west. The evening was devoted to a public illustrated lecture by Professor Fairchild on 'Glaciation in North America, with Particular Reference to the Effects of the Ice Sheet in Central New York.' The lecture was complimentary to the citizens of Syracuse, and an audience of about one hundred and fifty persons greeted the speaker in Assembly Hall, University Block. After the lecture there was an informal social meeting of the section in the rooms of the University Club.

On Friday the excursionists, under the leadership of Professors Fairchild and

Hopkins, visited the important gypsum quarries and the great glacial stream channels and 'fossil waterfalls' southwest of and near Fayetteville, about eight miles east of Syracuse. The noon hour was passed beside Blue Lake, at the base of a cliff marking an ancient Horseshoe Fall, and the time was improved by listening to an address by Mr. Frank B. Taylor, of Fort Wayne, Ind., on 'The Great Lakes in Their Relation to Local Geology.' Mr. Taylor showed by means of maps the extent of some of the great glacial lakes affecting the region and gave some of the results of recent studies by himself and others in the vicinity of Lake Huron.

Friday evening was utilized for a regular meeting of the section, in the rooms of the University Club, for the reading of papers. A list of the speakers with abstracts of their papers follows:

F. P. Gulliver on 'Sudbury Basin Shore-lines.' The author described the shore lines of Reservoir No. 5, of the Metropolitan System of reservoirs for Greater Boston, situated in the Sudbury Basin and largely in the towns of Marlboro and Southboro, Mass. Use was made of these shore lines for field work with the classes of the author at St. Mark's School, Southboro. The water in this reservoir has a successive series of changes of level from the high water of early spring to the low water of fall, and, therefore, the shores, which are largely composed of gravel, record the features of shore lines of elevation. At points where the water remains at the same level for the longest time the cliffs and beaches and other shore-line features are more strongly developed, and where the water was at a given level for a very short time the features are correspondingly faint. Bay-bars are formed at some points, spits at others, tombolos behind boulders, ripple marks on the bottom, sorting of fine and coarse material; in fact, nearly all the fea-

tures which are seen along most natural shore lines are here well represented. The paper was illustrated by means of photographs of various typical shore-line forms which were taken by the boys in the author's classes.

H. L. Fairchild on 'Some New Problems in Glaciology.' The author described by the aid of a large scale map some high-level glacial channels recently recognized by him in the Split Rock region southwest of Syracuse. These channels are at a greater altitude than the large and well-marked channels and waterfalls farther south which were included in the field studies of the meeting. The problem of the conditions of their formation has not yet been solved.

A. W. Grabau on 'The Physical Character and History of Some New York Formations.' This address was prepared for delivery in the field on Saturday, but it was deemed best to hear it at the meeting of Friday evening. The author briefly reviewed the New York series of sedimentary rocks and its nomenclature and described some of the difficulties in correlation which have been brought to light by recent detailed field studies.

C. J. Sarle on 'The Burrow Origin of *Arthropycus* and *Dædalus* (*Vexillum*).' The author's conclusions regarding the problematic genera *Arthropycus* Hall and *Dædalus* (Rouault) have been reached through a study of *Arthropycus alleghaniensis* (Harlan) and *Dædalus archimedes* (Ringueberg) as they occur in the Medina formation. One form of *D. archimedes* from the Medina is known as *Spirophyton archimedes* Ringueberg. In Europe the genus is known as *Vexillum* (Rouault). The author holds that *Dædalus* has always been described in an inverted position, that the ridges by which *Arthropycus* is known are only the bases of a fossil having a compound structure very similar to that of *Dædalus*, and that both are the result

of the repeated shiftings of burrows, probably of worms. The paper was illustrated by means of diagrams and some remarkably fine specimens.

David White on 'The Occurrence of Glacial Epochs in Paleozoic Time.' In this paper the author concisely stated the evidences from plant life and other phenomena in favor of the theory that there was extensive glaciation in Carboniferous time, particularly in portions of the southern hemisphere.

David White on 'The Age of the Wise and Harlan Formations of Southwestern Virginia.' The Wise and Harlan formations, 1,270 and 880 feet, respectively, in thickness, embrace the youngest Paleozoic (Coal Measures) rocks in the Estillville and Bristol quadrangles of the Virginia-Kentucky region. As originally proposed by Campbell, the Wise, consisting of a heterogeneous mass of sandstones and shales with coals, and the overlying Harlan, similarly constituted but somewhat more arenaceous near its base, were tentatively paralleled with the Monongahela and Dunkard formations in western Pennsylvania. Since then the basal portion of the Wise has been referred by Stevenson, on stratigraphic grounds, to the upper Pottsville, while the writer provisionally included the whole of the Wise in the Pottsville.

Fossil plants more recently gathered not only confirm this reference of the entire Wise, but show the lower portion of the Harlan also to antedate the Allegheny of the northern bituminous region. The plants from the roof of the High (Big) Splint coal near the top of Big Black Mountain are Kanawha (Pottsville) in age, as are also those from a horizon 150 feet higher, in the Harlan. Additional fossil material will be required before it will be possible to conclude with certainty whether the coals four to five hundred feet above the

High Splint are younger than the Stockton coal, the top of the Kanawha, which the writer places, together with the Black Flint, within the Pottsville, and which at highest can not be later than the Brookville coal (base of the Allegheny), where it is now placed by Stevenson.

The further progress in the study of the fossil floras brings support to the writer's rough provisional correlation of the Harlan formation with the Anderson in Tennessee, and in part with the Charleston sandstone in West Virginia, though the lower boundaries are probably earlier in the more southern formations. The enormous expansion already noted in the southward extension of the Sewell and lower Kanawha is apparently shared by the upper Kanawha and Homewood stages in the southern Appalachian coal field.

E. O. Hovey on 'The Western Sierra Madre of the State of Chihuahua, Mexico.' The paper described very briefly some of the geologic and geographic features of the country traversed by the author in company with Professor Robert T. Hill, on a journey by pack train from Nuevas Casas Grandes southward to Ocampo (Jesus Maria) and thence northeastward to Miñaca. The great plateau of Mexico, in Chihuahua at least, has been built up on a foundation of Cretaceous limestone and schist and post-Cretaceous granite by countless volcanic eruptions of lava streams and tuff beds. The constructional surface thus produced has been leveled by atmospheric action and sheetflood erosion, and the great cañons have subsequently been cut in the elevated plateau. The Navosaigame formation of ancient local conglomerate was described and named.

On Saturday the members and others in attendance upon the meeting again divided into two sections, one under the guidance of Professor Hopkins and the other under that of Professor Fairchild. The former

continued stratigraphic and economic studies near Fayetteville, while the latter went southwestward to the Split Rock quarries of the Solvay Process Co. in the heavy-bedded Onondaga limestone about five miles from the city. From near Split Rock can be seen some of the high-level ancient channels which have suggested to Professor Fairchild his new problems in glaciology. A section of the Split Rock party continued its excursion to Skaneateles Lake and returned through the Marcellus-Cedarvale glacial channel and the Onondaga valley to the city. Other places of interest visited by members were the serpentine dike in the northeastern part of the city and the extensive salt works.

Before adjournment the section passed a hearty vote of thanks to the City of Syracuse, Syracuse University, the University Club, the Citizens Club and the City Library Association, and expressed its appreciation of the labor in behalf of the meeting expended by Professors Hopkins and Fairchild. About fifty persons, half of whom were members or prospective members, attended the various excursions and sessions, aside from the number in attendance upon the public lecture.

EDMUND OTIS HOVEY,
Secretary.

SCIENTIFIC BOOKS.

Die Lichtsinnesorgane der Laubblätter. By G. HABERLANDT. Leipzig, Wilhelm Engelmann. 1905. Pp. 142, pl. 4.

In this work, Haberlandt has brought together the results of his extensive studies of the perception of light by the leaf, some of which have already appeared in his 'Physiologische Pflanzenanatomie' and in various papers. The book is one of great interest and it should be read by every botanist concerned with the relation of plants to stimuli. A critical reading, however, is very necessary, since the text contains much special pleading. The author rejects Sachs's view that heliotropic